REMARKS

In the Office Action mailed March 20, 2008, the drawings were objected to under 37 CFR 1.83(a) for failure to show every feature of the invention specified in the claims. The means for obtaining a droplet mixture and the cool flame (claimed in claim 1) are depicted in Figure 2, submitted with the response to a prior office action. The law requires an applicant to furnish a drawing where necessary for the understanding of the subject matter to be patented. See 35 U.S.C. 113. In this application, a drawing is not necessary for an understanding of the subject matter to be patented. All of the claims are directed to a process, and "[i]t has been USPTO practice to treat an application that contains at least one process or method claim as an application for which a drawing is not necessary for an understanding of the invention under 35 U.S.C. 113 (first sentence)." The applicant respectfully requests that the Examiner withdraw this objection to the drawings as previously submitted.

Claims 1-11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over US 4,054,407 (Carruba et al) (hereinafter the '407 patent) in view of Suppes et al (Compression-Ignition Fuel Properties of Fischer-Tropsch Syncrude, Ind. Eng. Chem. Res. 1998, 37, 2029-2038), US 4,764,266 (Chen et al) (hereinafter the '266 patent) and US 3,810,732 (Koch) (hereinafter the '732 patent), US 3,620,657 (Robinson) (hereinafter the '657 patent) or DE 19860308 (Koehne et al) (hereinafter the '308 patent). The office action also discussed claims 1, 2 and 4-28 in light of these references and this response responds to that discussion of the claims 1, 2 and 4-28 too. Applicants respectfully traverse this rejection based on the claims as previously presented.

Claim 1 claims a process for combusting a liquid Fischer-Tropsch derived hydrocarbon fuel, the process comprising: obtaining a droplet mixture comprising droplets of the liquid Fischer-Tropsch derived hydrocarbon fuel in an oxygen containing gaseous phase; subjecting the droplet mixture to a cool flame under evaporation conditions effective to produce an evaporated gaseous mixture comprising oxygen and hydrocarbons, the cool flame having a temperature of between 300 °C and 480°C when the pressure is 1 bar; and combusting the evaporated gaseous mixture under combustion conditions effective to produce a heat of combustion.

The '407 patent describes a method for combusting nitrogen-containing fuel also known as "dirty fuel" such that the level of NO_x emissions is reduced. Dirty fuels "have typically contained, as impurities, sizable amounts of fuel nitrogen, i.e., nitrogen-containing compounds," and "a fuel containing less than about 0.05% by weight of nitrogen present in such nitrogen-containing compounds would not be considered to be a nitrogen-containing fuel." *See* col. 1, lines 41-48 and

col. 4, lines 57-60. The method described in the patent comprises a two-stage combustion with an optional preheating step. The patent discloses that the preheating may be carried out by controlled preburning of the fuel-air feed which is controlled to raise the temperature of the feed to no more than 1000°C, and preferably no more than 700 °C. *See* col. 10, lines 17-51. This preburning occurs as a result of "burning a portion of the available fuel before the first stage." *See* col. 10, lines 27-28.

The Suppes et al. reference teaches that syncrude, a Fischer-Tropsch synthesis product can be used as a compression-ignition fuel without further refining the syncrude. The article compares the syncrude to diesel fuel and describes possible additives that could be added to the syncrude so that it would meet diesel fuel specs in at least some parts of the world.

The '266 patent describes an integrated refining scheme for hydroprocessing high boiling fractions such as gas oil and catalytically cracked cycle oils to produce premium quality distillates. The patent briefly mentions that Fischer-Tropsch synthesis products may be fed to the two stage hydrocracking process described in the patent. There is no other mention of using a Fischer-Tropsch synthesis product in the patent. The patent does describe a middle distillate fraction produced by the first stage of this hydrocracking method that is quite aromatic in character as generally meeting the product specifications for use as a light fuel oil, e.g., home heating oil. *See* col. 10, lines 16-34.

The '732 patent describes a method of flameless combustion of a gaseous or vaporous fuel-air mixture accomplished without a catalyst. The apparatus is heated to 950 °C and then the flow rate is increased. "[T]he large radiating surface formed by the highly porous structure cause[s] rapid heating of the reactants . . . [with] ensuing rapid evaporation of the fuel." *See* col. 3, lines 10-13. The temperature is typically maintained between about 1500 °C and 2000 °C. *See* col. 3, lines 66-68. The patent teaches that if a liquid fuel is used, means of evaporating the fuel may be provided. See col. 5, lines 13-14. "The fuel can, for instance, be evaporated by heating the feed line or it could be sprayed, for instance, by means of a nozzle." See col. 5, lines 14-17.

The Examiner submits that "[i]n regard to claims 1, 2 and 4-28, for the purpose for providing a suitable clean and environmentally friendly alternative fuel for the US 4,054,407 (Carubba et al) heating systems, it would have been obvious to a person having ordinary skill in the art to operate heating system burners with Fischer-Tropsch fuel having additives and low aromatic and sulfur content and a density similar to that of home heating fuels, in view of the teaching of the Suppes et al or US 4,764,266 (Chen et al.)."

None of the references that describe vaporizing liquid feeds in a cool flame and then combusting the fuel mixture describe the use of Fischer-Tropsch derived feeds. The fuels mentioned in the references cited by the examiner are hydrocarbon fractions that contain a large number of different hydrocarbons. Vaporizing and combusting these types of fuels results in the formation of coke deposits in the evaporation/burner unit partly due to the incomplete evaporation of all the components in the fuel. Fischer-Tropsch derived products are composed of iso and n-paraffins and surprisingly evaporate completely in the cool flame evaporation. This provides a system that does not result in the formation of coke deposits in the porous evaporator/burner unit. There is nothing in the prior art references that would have led a skilled person to use a Fischer-Tropsch feed in the specific type of process claimed here.

The references relating to use of Fischer-Tropsch fuel do not mention the use of these types of fuels or the advantages of using these types of fuels in the method as claimed in claim 1. It would not have been obvious to one of ordinary skill in the art to use a liquid Fischer-Tropsch derived hydrocarbon fuel in the process as claimed in claim 1.

In light of the above, Applicants respectfully request allowance of the amended claims of this application. Should the Examiner find any impediment to the allowance of this case that could be corrected by a telephone interview, the Examiner is requested to initiate such an interview with the undersigned.

Respectfully submitted,

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